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EXAMINER	
LUCAS, ZACHARIAH	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/685,925	Applicant(s) ANDERSON ET AL.	
	Examiner Zachariah Lucas	Art Unit 1648	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 September 2007*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 20-47* is/are pending in the application.
4a) Of the above claim(s) *32-34 and 38-40* is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-9,20-31,35-37 and 41-47* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Currently, claims 1-9, and 20-47 are pending in the application.

2. In the prior action, the final rejection mailed on May 11, 2007, claims 1-9 and 13-17 were pending and rejected.

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 11, 2007 has been entered.

In the submission, the Applicant cancelled claims 13-17, and added new claims 20-47.

4. Newly submitted claims 32-34 and 38-40 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

The invention of claims 32-34 is related to the previously elected method as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case, the claimed kits may be used in methods for detecting bacterial cells, or in methods for the identification of inhibitors or phage infection of bacterial cells.

The invention of claims 38-40 is related to previously elected invention as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination has separate utility such as the detection or quantification of phage particles. See MPEP § 806.05(d).

The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 32-34 and 38-40 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

5. Claims 1-9 and 20-31, 35-37, and 41-47 are under consideration.

Claim Objections

6. **(Prior Objection- Withdrawn)** Claim 13 was objected to because of certain informalities. Applicant's arguments in traversal are found persuasive. The objection is therefore withdrawn.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **(New Rejection)** Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This claim reads on the method of claim 24, which in turn depends from claim 22, and requires that "said antibody is used in an immunoassay." Claim 22 reads on a method for the detection of a bacterial cells comprising the use of parent phage to infect the target bacterial cells if present, and to thereby produce new phage, the method comprising contacting the parent phage infected sample with a substrate comprising immobilized binding agent specific to the new bacteriophage, wherein a complex is formed between the new bacteriophage and the substrate comprising the immobilized binding agent. Claim 24 requires that the immobilized binding agent is an antibody that binds the new bacteriophage. Thus, claim 24 reads on a method wherein an antibody that binds to the new bacteriophage is part of a substrate used to bind new bacteriophage if present in the infected sample. Because the antibodies of claim 24 are used in the contacting step of claim 22, it is not clear what is meant by the requirement of claim 25 that the antibodies are used in an immunoassay. It is not clear if the Applicant is merely identifying the contacting step of claim 22 as being part of an immunoassay

(an inherent feature if an antibody is used), or if the Applicant is requiring the isolation of the antibodies from the complex formed in claim 22 and the further use of the isolated antibodies in further immunoassays.

Clarification of the claim language is required.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. **(Prior Rejection- Maintained)** Claims 1-4, 6, and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rees et al. (WO 92/02633) in view of Miller et al. (WO 01/09370- as translated in U.S. 2002/0127547). It is noted that new claim 20 has been added which requires that the detection of the progeny phage is through the use of an immunoassay. Such is disclosed by Rees. Pages 15-16. In addition, new claims 45 and 46 have been added to the application, which claims read on methods similar to claims 1 and 20, but wherein the method includes the quantification of the bacterial cells, rather than merely the detection, based on the number of progeny phage detected in the sample. The rejection is therefore maintained over claims 1-4, 6, and 9; and extended to new claims 20, 45, and 46.

The Applicant presents two arguments in traversal of the rejection. The Examiner will approach these arguments in the reverse order from that presented in the Applicant's Response. The first argument is that there would have been no motivation to combine the teachings of these references as Miller teaches away from the combination. The second argument is that the combined teachings of these references fail to teach each limitation of the claimed inventions. These arguments are not found persuasive.

There is adequate motivation to combine the teachings of the cited prior art. The Applicant asserts that, because Miller teaches a method asserted to have an improvement over the prior art by avoiding the necessity for a cultivation step, those of ordinary skill in the art would not have been motivated to have modified the Miller method through the use of a cultivation step such as disclosed in Rees. While this argument has merit, it is noted that the base reference in the present rejection is the Rees, not the Miller reference. Moreover, the fact that one invention is disclosed as inferior in some manner than another is not considered to be adequate "teaching away" such that those in the art would lack motivation to use or improve it in favor of the superior invention. See e.g., MPEP 2145 X.D.1. In particular, there are not teachings in the Miller reference that indicate that the method of Rees, or that methods involving cultivation steps in general, are unsuitable for the detection of bacteria. Rather, the reference merely indicates that the disclosed method which does not include such a step is superior in the speed by which the results of the assay may be achieved. Thus, the Applicant's assertion that there would have been no motivation to look to the teachings of Miller to improve the assay of Rees are not found persuasive.

Further, in its discussion of the decision in *KSR International v. Teleflex Inc.* (82 U.S.P.Q.2d 1385, 2007), the Supreme Court indicated that the "combination of familiar elements according to known methods is likely to be obvious when it does no more that yield predictable results." Page 1389. One such embodiment of achieving such predictable results is the application of a known device for the improvement of a known technique. See e.g., 72 Fed Reg 195, at 57529, and 57531 (relating rational (D) for finding an invention obvious).

As was previously described, the present rejection is a modification of the known bacteria detection method (technique) of Rees through the use of the known bacteriophage substrate (device) disclosed in Miller. The Rees reference teaches that the parent phage may be either killed or removed from the test sample. As was described in the prior action, Miller teaches a device in which the parent phage are immobilized on a substrate such that they may be readily applied to a sample for a similar purpose (the infection of target bacterial cells if present in the sample). While the methods of Miller and Res vary by how the samples are treated after this point, it would nonetheless have been obvious those of ordinary skill in the art that the substrate immobilized phage would be a convenient means for the introduction and removal of the parent phage so as to no interfere with the detection of the progeny phage. I.e., the results of using the substrate-associated phage of Miller in the methods of Rees would have provided no more than the predictable results of such a combination.

Thus, the teachings of Miller are not the type of "teaching away" that would have lead those in the art away from the use and improvement of the methods disclosed by Rees. Thus leading to the Applicant's second argument in traversal, that the combined references do not teach each limitation of the claimed inventions. In particular, the Applicant asserts that the combined teachings fail to teach a method wherein the immobilized phage a removed from the sample that is to be subjected to a detection assay.

It is first noted that the present claims nowhere make reference to a "sample that is subjected to a detection assay." Rather, the claims refer only to "the sample," which would appear to include those portions of the sample that do not react with the phage as well as those that do. However, even if the Applicant's interpretation of the claims is accepted, the argument is still not found persuasive.

This is because, the Applicant's distinction of what constitutes the sample to be subjected to the detection assay between the Miller reference and in the present claims would have been meaningless based on what would have been obvious to those of ordinary skill on the art from the combination of Rees with Miller, and in particular from the use of the immobilized phage of Miller in the method disclosed by Rees. In Miller, the sample to be tested is, as asserted by the Applicant, the target bacteria (if present) bound to and infected by the immobilized phage. However, in the method of Rees, the sample to be tested is the same as in the present claims, i.e., the resulting solution after target bacteria have been infected by the phage and permitted to produce and release progeny phage. Thus, from the teachings of Miller with respect to the immobilized phage, it would have been predictable to those of ordinary skill in the art that the progeny phage, produced during the cultivation step, would have been free from the support, and could therefore be detected in sample, regardless of the timing of the removal of the parent phage (so long as infection and production of the progeny phage was permitted). In particular, it would have been obvious to those of ordinary skill in the art to remove the substrate comprising the immobilized parent phage prior to the detection of the progeny phage as, at that point, the presence of the substrate would no longer be required, its function having been fulfilled.

It is also noted, that as a side issue, the Applicant asserts that the Miller reference fails to teach or suggest the removal of the parent phage at all. This argument is not found persuasive as the rejection is not a rejection based solely on the teachings of Miller, but on the combination of

Miller with Rees, wherein in the Rees reference does suggest the removal of the parent phage. Thus, while it is agreed that Miller does not necessarily indicate that the parent phage need be removed for the technique disclosed by that reference, the teachings of Rees clearly do teach such a step in the base technique of Rees. This assertion is therefore not found persuasive.

In the Response, the Applicant additionally added new claims 45 and 46, which read on methods for the quantification of bacterial cells through a method similar to that of claim1. It is noted that each of the Rees and Miller references indicate that the disclosed methods of bacterial detection using phage may also be used for the enumeration of that target bacterial agents. See e.g., Rees, page 2, lines 2-4; and Miller, page 1, paragraph [0010]. It would therefore have been obvious to those of ordinary skill in the art to have so applied the method resulting from the combination of the teachings thereof as described above. While the references do not appear to specifically described how such enumeration would occur, it is noted that it would have been apparent to those of ordinary skill in the art that the number of resulting progeny phage produced in the described methods would be dependent on the number of target bacterial cells present in the test sample. Thus, it would have been obvious to those of ordinary skill in the art to quantify the number of target cells in the sample based on the number of progeny phage produced during the course of the detection method. Thus, claims 45 and 46 therefore represent obvious variants of the methods suggested by the teachings of Rees and Miller.

For these reasons, and the reasons of record, the Applicant's arguments in traversal are not found persuasive, and the rejection is maintained.

11. **(Prior Rejection- Maintained)** Claims 7 and 8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rees and Miller as applied to claims 1-4, 6, and 9 above, and further in view of Vafai (U.S. 5,824,319). In addition to these claims, the Applicant has added new claims 21 and 47, which read, respectively, on the methods of claims 1 and 45, wherein the detection comprises visual detection. As claims 7 and 8 involve methods including a visual detection step, the rejection is extended to new claim 21 for the same reasons as applied to the previous claims. Similarly, the rejection is also extended to new claim 47 on substantially similar grounds (as Rees and Miller render independent claim 45 obvious for the reasons indicated above). The rejection is therefore maintained over claims 7 and 8, and is extended to new claims 21 and 47.

Applicant traverses to this rejection for the same reasons as asserted with respect to the rejection over Rees and Miller above. As the arguments were not found persuasive with respect to that rejection for the reasons provided above, the present rejection is also maintained.

12. **(Prior Rejection- Maintained)** Claims 13 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rees in view of Miller as applied to claims 1-4, 6, and 9 above, and further in view of Vonk et al. (J Immunol Methods 137: 133-39). These claims have been cancelled by the Applicant, and replaced by new claims 22-25. In addition, new claim 27 requires that the detection technique is an immunoassay; and new claim 28 requires that the detection comprises visual detection. Such limitations are disclosed by Rees (pages 15-16), and Vonk (page 135- teaching the use of color- thus visual- detection of viral particles). Thus, the

rejection is withdrawn from cancelled claims 13 and 14, but is extended to new claims 22-25, 27, and 28.

Applicant traverses to this rejection for the same reasons as asserted with respect to the rejection over Rees and Miller above. As the arguments were not found persuasive with respect to that rejection for the reasons provided above, the present rejection is also maintained.

13. **(Prior Rejection- Maintained)** Claims 5 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over, respectively, Rees and Miller as applied to claims 1-4, 6, and 9 above; or Rees and Miller in view of Vonk as applied to claims 13 and 14 above, and further in view of Sun et al. (J Indust Microbiol Biotechnol 25: 273-75). Claim 15 has been deleted, and replaced by new claim 26. The rejection is therefore withdrawn from claim 15, maintained against claim 5, and extended to new claim 26.

Applicant traverses to this rejection for the same reasons as asserted with respect to the rejection over Rees and Miller above. As the arguments were not found persuasive with respect to that rejection for the reasons provided above, the present rejection is also maintained.

14. **(Prior Rejection- Withdrawn)** Claims 16 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over either of Wilson (U.S. 5,985,596) in view of Olsvik et al. (Clin Microbiol Rev 7:43-54), Sun et al. (J Indust Microbiol Biotech 25: 273-75), and Vonk (supra). These claims have been cancelled from the application.

15. **(New Rejection- Necessitated by Amendment)** Claims 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madonna et al. (U.S. 7,166,425, previously published as U.S. 2004/0224359), in view of Rees (supra). It is noted that these claims, unlike the pending claims under examination in the immediately prior office action, read on methods where the parent phage are immobilized on a substrate after the incubation of the infected sample and release of the progeny phage. This differs from the claims pending and under consideration in the immediately prior office action in that those previously pending claims which required that the infected sample was incubated such that new phage particles would be released after the parent phage were immobilized.

These new claims read on substantially similar methods to the claims rejected in the Office actions mailed on February 7, July 21, and November 13, 2006 over the teachings of Madonna (either alone, or in combination with other references). As was described on pages 3-4 of the February 2006 action, pages 2-3 of the July 2006 action, and on pages 4-5 of the November 2006 action, the priority provisional application of the current application does not provide adequate descriptive support for embodiments wherein the parent phage is immobilized after release of the progeny phage to pre-date the teachings of Madonna.

As was previously described in the actions referenced above, Madonna teaches methods for the detection of bacterial cells in a sample comprising steps of contacting a sample with a phage comprising a binding agent (i.e. biotin), incubating the sample such that the phage infect target bacterial cells if any and produce progeny phage, immobilizing the parent phage on a substrate and removing them from the sample, and detecting new phage in the sample from which the parent phage have been removed. See e.g., claims 18 and 19. Further, while Madonna teaches a different method for the detection of the progeny phage from that of the present claims or in Rees, the reference also indicates that alternative methods known in the art may be used, including immunoassays and spectroscopy and chromatography (thus visual detection) may be used. See e.g., column 6, lines 17-20. However, the reference neither teaches the use of the method for the quantification of the target bacterial cells, nor teaches that the progeny phage are detected through the use of an immunoassay, or by visual quantification.

The teachings of Rees have been described previously. The reference provides a method similar to that of Madonna, except that the parent phage are neither immobilized or constructed to comprising a binding agent, and the method entails an alternative modes for the detection of the progeny phage. However, Rees does indicate that the disclosed methods would be useful for the quantification as well as the detection of target bacterial cells. See e.g., page 2, lines 2-4. Moreover, those of ordinary skill in the art would have understood that the number of progeny phage produced upon the infection of the test sample with the parent phage would reflect the number of progeny phage produced (because the number of progeny phage would be dependant on the number of target bacterial cells available for the parent phage to replicate in). In view of this, and as the method of Madonna also relies on the ability of a parent phage to infect a target bacterium, it would also have been obvious to those of ordinary skill in the art to use the method of Madonna for the detection and quantification of bacterial cells.

The combined teachings of these references therefore render the claimed inventions obvious.

16. **(New Rejection- Necessitated by Amendment)** Claims 29-31 and 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madonna in view of Rees, and further in view of Vonk (supra.). These claims are directed to methods for the detection or quantification of bacterial cells such as is described in claims 35-37 above, except that the progeny phage are detected through the use of a second substrate comprising a binding agent (e.g. an antibody) specific for the progeny phage, and detecting or quantifying the resulting progeny phage/binding agent complexes.

The teachings of Madonna and Rees have been described above. As indicated above, the combined teachings of these references render obvious the detection and quantification of target bacterial cells in a sample according to the method of claim 35 (corresponding to the first contacting, the incubating, and immobilizing steps of claims 29 and 41). In addition, while the Madonna reference teaches the detection of the progeny phage through the use of mass spectrometry, the reference also indicates that other detection technologies may be used. Column 6, lines 17-20. However, the teachings of Madonna and Rees do not teach or suggest embodiments wherein the progeny phage are detected through the use of a second substrate as described in the rejected claims.

As was described in the prior action, Vonk teaches a method for the detection of a virus comprising the use of magnetic beads (a substrate) having antibodies against the virus conjugated (immobilized) thereto. Abstract. The reference teaches that such beads are added to the test sample, are incubated for sufficient time for the beads to form complexes with any present virus, and are then separated from the sample and assayed for the presence of the virus. From these teachings, it would have been obvious to those of ordinary skill in the art that such beads would be useful for the detection of viruses (including phages) in a sample generally, and would therefore have been obvious as functional equivalents (See MPEP 2144.06 II) of the detection methods suggested by Madonna. It would therefore have been obvious to those of ordinary skill in the art to substitute such a method for the phage detection method of Madonna. The combined teachings of the references therefore render the claimed methods obvious.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

18. No claims are allowed.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachariah Lucas whose telephone number is 571-272-0905. The examiner can normally be reached on Monday-Friday, 8 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bruce Campell can be reached on 571-272-0974. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Z. Lucas/
Patent Examiner, AU 1648